**EMERALD ROYAL INT’L SCHOOL**

**LESSON PLAN/NOTE FOR WEEK 4 ENDING: 26TH MAY, 2023**

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| **Term** | 3rd |
| **Week** | 4 |
| **Date** | 22/05/2023 |
| **Class** | SSS 1 |
| **Subject** | Physics |
| **Topic** | Fluids at rest and in motion |
| **Sub-topic** | Surface tension |
| **Period** | 1 and 2 |
| **Time** | 11:50-1:00 |
| **Duration** | 80minutes |
| **Number in class** | 8 |
| **Average age** | 13years |
| **Sex** | Mixed |
| **Specific objectives** | By the end of the lesson, the students should be able to:   1. Define surface tension. 2. Explain capillarity 3. Explain viscosity |
| **Rationale** | To enable the students understand surface tension in liquids |
| **Previous knowledge** | Students should have been taught the kinetic theory of liquids |
| **Instructional aid** | One guide sheet for each student, oil, water, capillary tubes, science notebook and a science textbook. |
| **Reference** | * M.W. Anyakoha. New school physics for secondary schools. Africana first publishers PLC. page 104-109 * P.N. Okeke. Macmillan Senior Secondary Physics. Pearson. Page 68-71 |

**LESSON DEVELOPMENT**

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ ACTIVITIES** | **LEARNING POINTS** |
| **Introduction** | The teacher introduces the lesson by stating that the molecules of liquids and gases are freer to move than those of solids. Therefore both liquids and gases are able to flow. For this reason they are grouped together as fluids. They have no rigid shape and respond to forces much differently than solids. | The students listen attentively. | To give the students a proper understanding of surface tension. |
| **Step I** | *Surface tension*  Surface tension is the force acting along the surface of a liquid, causing the liquid surface to behave like a stretched elastic skin.  Surface tension is considered to be due to forces of attraction between the molecules of the liquid.  We can make a dry needle or razor (which should normally sink in water) to float in the surface of clean water. This can be achieved by placing the needle or razor blade carefully on a small piece of filter paper which is then placed gently on the water surface. The weight of the needle or razor-blade acting downwards is supported by some surface forces acting upwards. The needle therefore rests on the ‘skin’ of the water surface making only a slight depression on it.  The above observation shows that the surface of a liquid appears to be stretched like an elastic skin. The surface appears to be under some force or tension which we call surface tension. | The students begin to develop an understanding of the surface tension of liquids. | To ensure proper understanding of the lesson. |
| **Step II** | *Capillarity*  Capillarity or capillary action is the tendency of a liquid to rise or fall in a narrow tube.  If we dip three tubes with fine bores but with different diameters into clean water, we observe that the water rises in the tubes but the narrower the bore the higher the height to which the water rises. | The students listen attentively to the teacher’s explanation. | To ensure that all the students are carried along. |
| **Step III** | *Viscosity*  Viscosity is the internal friction between layers of a liquid or gas in motion.  It is observed that it is easier to pour water or kerosene from a container than to pour honey or engine oil. A little stone dropped into a cylinder of water gets to the bottom of the cylinder faster than when the same stone is dropped into a cylinder containing engine oil. These differences are due to the property of viscosity in these liquids.  We can consider viscosity as friction in fluids. The movement of one layer of fluid over a neighboring layer is opposed by viscous forces. | The students listen attentively to the teacher’s explanation. | To ensure that all the students are carried along. |
| **Summary** | The tendency of the surface of liquids to act like a stretched elastic skin is known as **surface tension**. It is due to the attraction of surface molecules by those below them. Due to surface tension, drops of liquid assume spherical shape.  **Capillarity** is the tendency of liquids to rise or fall in a narrow tube. It is partly due to surface tension along the surface of the liquid and partly to adhesion and cohesion.  **Viscosity** is the internal friction between layers of a liquid or gas in motion. Viscosity decreases with temperature. | The students listen attentively to the teacher’s explanation. | For reference purpose. |
| **Evaluation** | The teacher evaluates the students by giving the students the following class work.   1. Explain the following terms, viscosity, and terminal velocity. 2. Draw a diagram to show the forces acting on a steel-ball falling through a viscous liquid. | The students answer the question in their science notebook. | To ascertain the students level of understanding of the lesson. |
| **Conclusion** | The teacher makes correction of the classwork. | The students copy the correction in their exercise books. | For reference purpose |
| **Assignment**  **(Homework)** | The teacher gives the students the following assignment.   1. What is surface tension? Explain the phenomenon in terms of intermolecular forces. 2. Why is it that a needle may float on clean water but sinks when detergent is added to it? | The students copy the questions into their exercise books and take home for solving. | To facilitate critical thinking of the students at home. |



20/7/2023

Principal Head Instuctor